Since Illouz and Fournier pioneered to practise liposuction in the 1970’s, liposuction has become a common and safe aesthetic plastic surgery procedure worldwide for shaping the body by removing localised subcutaneous fat collected through a few small puncture sites. Since then, liposuction has undergone many important technical refinements which permit the removal of a large volume of fat and major contour changes achieved safely in a single session with minimal blood loss. The use of tumescent infiltration technique and the application of ultrasonic energy to emulsify fatty tissue are the most significant improvements to facilitate both sophisticated and massive liposuction recently.

**Tumescent Liposuction**

In 1987, Jeffrey Klein (1) first reported his experience of liposuction with the tumescent infiltration technique. This consists of injecting into the subcutaneous fat a large volume of lactated Ringer's Solution (or normal saline) containing superdiluted lignocaine and epinephrine (0.05%-0.10% lignocaine with 1:1,000,000 epinephrine). The manufacturers' recommended maximum dose of lignocaine for normal therapeutic use is 7 mg/kg (500 mg for a 70 kg person) but patients undergoing tumescent liposuction receive doses far in excess of the manufacturers' recommended maximum to 40-50mg/kg. The lignocaine-epinephrine solution creates intense vasoconstriction, profound local anaesthesia, and enlarges the subcutaneous space. Tumescent liposuction results in negligible blood loss with diminished bruising, provides complete fluid replacement, and facilitates use of smaller cannulae for superficial lipo-sculpture.

With the tumescent technique, liposuction can be safety performed in the office/day case setting for patients requiring localised areas of lipo-sculpture as it provides adequate local anaesthesia and eliminates the risks associated with general anaesthesia. It also provides adequate pain relief post-operatively and decreases post-operative bruising, discomfort and seroma formation.

**Third Generation Ultrasonic Liposuction**

Ultrasound-assisted liposuction probes emit high frequency acoustic forces that cause cavitation within the infused tumescent solution in the fat tissue, resulting in displacement of adipocytes and dislodgement of fat from the tissue matrix. The third generation ultrasonic liposuction system (VASER Lipo System) utilises a solid, side-grooved, blunt-tipped probe design to redistribute the ultrasonic energy from the tip to the sides in the region’s immediate proximity. Additionally, it offers a choice of continuous ultrasound energy for debulking of fibrous fat tissue or a pulsating mode for sculpting softer fat tissue with less ultrasound energy and less thermal effects on the overlying thin skin.

The aspirate collected during an ultrasound liposuction is a uniform emulsification of viable fat cells. The amount of blood within the aspirate has been reduced to less than 3% of the volume of aspiration (Fig. 1).

These changes have advanced liposuction procedures by improving safety and efficiency, reducing complications like bruising / haematoma, seroma formation and allowing faster patient recovery with less pain and bruising/swelling.

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**Fig. 1 Yellowish fat aspirate with minimal blood extracted tumescent local anaesthesia and VASER liposuction**

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Liposuction for Body-Sculpture

Individuals who have body contour varying from the accepted ideals may seek assistance in the form of liposuction surgery. They should be encouraged to use diet and exercise modifications as a first approach to improving their overall body shape. Failing that, the excessive subcutaneous fat accumulation involving the abdomen, torso, back, hips and thighs may be amenable by liposuction surgery.

The ideal patient should be in good health, preferably within 15 kg of their ideal body weight and has subcutaneous fat accumulation in areas that are out of proportion to the overall body shape. Liposuction surgery can then be used as a tool to further modify and improve appearance. The patient should also preferably have good skin tone which will contract adequately following the liposuction procedure.

Some of these patients will present with one or two areas requiring contouring by liposuction surgery, whereas others may require multiple areas to be treated. Most patients can be treated with tumescent local anaesthesia combined with oral / intravenous sedation in an outpatient / day surgery setting. For patients with multiple sites of treatment, general anaesthesia may be required in the hospital to avoid the excessive administration of lignocaine and to improve patient comfort. An overnight stay after the GA would be advisable before discharge.

To ensure symmetry and smoothness of the suctioned area, ‘cross-tunnelling’ of the treated area and ‘feathering’ of the adjacent areas should be done. With the use of tumescent local infiltration, ultrasonic liposuction and superficial suction with small calibre cannulae, post-operative pain, swelling and bruising would be minimised. Most patients can return to moderate daily activity in 2-3 days’ time. Thereafter, elastic compression garments should be worn for a few weeks.

When combined with a programme of exercise and proper nutrition, liposuction surgery offers improvement in body contour for the abdomen, flanks, hips and back. Patients should expect to have a better body shape even on wearing a revealing swimsuit, feel better about their appearance and enjoy an improved fit of their clothing (Fig.2,3,4,5).

Liposuction for Obesity

Liposuction has undergone many important technical refinements. The combined use of smaller diameter cannulae, tumescent infiltration and ultrasonic fat emulsification techniques permit a large volume of fat removal and major contour changes with minimal blood loss and increased safety without blood transfusion in obese patients undergoing liposuction.

However, liposuction is not a treatment for generalised obesity and is not an effective means of weight reduction. A major liposuction under general anaesthesia may remove around 6 litres of emulsified fat. The patients will not see a significant reduction in weight unless they undergo multiple liposuction procedures.

Careful patient selection for liposuction of obese patients is important. They should be medically fit for a general anaesthesia as large volume liposuctions will be performed under general anaesthesia in the hospital. An overnight stay is essential after the GA.

The removal of excessive accumulation of fatty tissue in one or two major areas is most rewarding in correcting the proportion and contour of the body of the obese patients. Most patients are delighted with their overall body contour change, their ability to fit into clothing that has not been possible for years (Fig. 6, 7).
Though some contour irregularities may exist and tissue ptosis or increased skin laxity may develop after massive liposuction, these can be further dealt with by additional ancillary procedures like abdominoplasty or plication of the rectus sheath (Fig. 8, 9, 10) (due to diastasis of the rectus muscle from multi-parturition).

**Conclusion**

Liposuction has undergone many important technical refinements and is a safe and effective means of body contouring for fit and healthy patients. In obese patients, large volume liposuctions can also be safely offered to correct the proportion and contour of the body with gratifying results.


